MISSION CRITICAL ENERGY

Technical Instruction - **Connecting Input Devices to the FlexSCADA**

The FlexSCADA Q5 and Q5 Pro both come with built in analog input channels numbered 1-8. These input channels have a signal input (labeled +) and signal return/ground (labeled -). For sensors that do not need a signal return, and only have one signal output wire, only the "+" will need to be connected. For stability of the sensor reading, a 'reference ground' is recommended, but not required.

VOLTAGE SIGNALS:

By default, the FlexSCADA ships with all 8 channels configured for ±60V or Voltage Mode. To verify which mode the analog input channel is utilizing, a visual inspection of the jumpers above the channel combined with the jumper diagram above the jumper row on the device itself. For reference, the diagram is also included in figures 1, 2 and 3 below.

CAUTION: Movement of the jumpers should always be done with power to the device 'OFF.' Failure to do so may result in damage to the device or user.

The default Voltage Mode, which is anything that outputs in the 2V-60V range, a common sensor output of 0-10V or 0-5V will work well. The AMPX-100 is a popular 100A coil sensor available from Mission Critical Energy that outputs 0-5V, and works best in this default Voltage Mode.
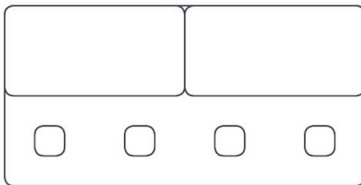

Figure 1

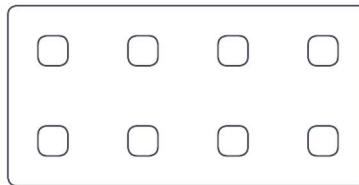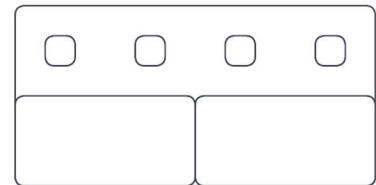Voltage Mode
±60V

Figure 2

mV Mode
±2.4V

Figure 3

mA Mode
±25mA

HIGER VOLTAGES:

To measure voltages above 60V, the use of an external voltage reducer will be necessary. The HV10M High Voltage Reducer is a voltage reducer available from Mission Critical Energy capable of reducing up to 300V down to 60V. Since the FlexSCADA itself would only be receiving a ±60V signal after having the signal reduced by the voltage reducer, the channel should be kept in Voltage Mode for this. This is true for both AC and DC signals, and will require some changes within the webhost based on the type of voltage being monitored. This converter must be used for all AC voltage monitoring. AC lines must never be plugged directly into the analog input channel as it will damage the device.

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LOWER VOLTAGES:

A 0-2V signal would technically be readable in Voltage Mode. However, that runs the risk of degraded resolution. Therefore, for the highest level of clarity, signal outputs of 2V and below should be run in mV mode. Refer to Figure 2 to see how mV Mode is configured using the jumpers.

FREQUENCY DEVICES:

The Vwind-IMP is an example of a sensor with a reed relay (or pulse) output. This is a wind speed sensor available from Mission Critical Energy. In order to read a signal from the VWind-IMP it is recommend connecting one of the leads to a voltage source such as the "5.0V Out" port on the FlexSCADA and the other lead to the "+" on the chosen channel in Voltage Mode. This is an example of where a reference ground can be utilized, helping to stabilize the final readings of the VWind-IMP. The jumpers would be configured in the default option (figure 1). Not all pulse output sensors are the same. Consult the configuration paperwork for each sensor during installation of device.

CURRENT LOOP DEVICES:

The 4-20mA current loop is standard in the signaling world. To connect these 4-20mA devices to a FlexSCADA input, the channel must be set to ±25mA or mA Mode. Refer to Figure 3 to see how mA Mode is configured using the jumpers. The signal wire should be attached to the + terminal of the input channel. The common should be connected to the – terminal.

ONE WIRE SENSORS:

The "One Wire" port on the FlexSCADA is for use with digital one wire sensors, such as the temperature versions which are available from Mission Critical Energy. Additional one-wire sensors can be used, such as humidity or pressure.

RJ45 Connections:

The expansion port (left side) and ethernet port (right side) on the FlexSCADA uses standard ethernet cabling. All ethernet cabling should be CAT5e or better. Make sure any cabling used is environmentally appropriate. Unprotected outdoor cabling must account for UV, rain, ice (location dependent), local temperature ranges, ect. Direct bury cabling must account for permanent humidity. Please note it is not recommended to use non-direct bury cable for underground installations, even when installed in conduit. This is because the conduit will fill with water overtime, and results in moisture buildup issues. For appropriate wire gauges based on the wire run (length), consult with the sensor manufacturers.

EXPANSION PORT DEVICES:

The FlexSCADA has an expansion port for use with various hard coded devices. An example of this would be the BME680 Environmental Sensor available from Mission Critical Energy. This device measures relative humidity, barometric pressure, ambient temperature, and volatile organic compounds. Devices using the expansion port connect with the FlexSCADA using CAT5e ethernet cabling.

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DIGITAL DEVICES:

Digital sensors communicate using the Modbus standard. In order to connect these to the FlexSCADA, the FlexSCADA will need to be connected to a network switch (such as the Netgear GS305E or equivalent) using an ethernet cable to the FlexSCADA's ethernet (right side) port. Connection to the expansion port (left side) will result a failure to connect to the digital network system. Modbus TCP devices can then be connected directly to this network using that same network switch. For RS485, RS232, or RS422 Modbus devices, also known as Modbus RTU, a quality converter that is a Modbus gateway will be needed, such as the ICP CON tGW-715i in the case of RS485 or RS422. Always consult the sensor product sheet to verify the communication parameters prior to final installation.

For further assistance, please contact the FlexSCADA support team at +1 (716) 276-8465, or visit our website at www.flexscadafusion.com